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Forest insect and disease conditions in Newfoundland and Labrador in 1986

L. J. Clarke and G. C. Carew

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FOREST INSECT AND DISEASE SURVEY (FIDS)

1936-1986

Fifty Years of Continuous Service , Forest Insect and Disease Survey in Canada

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Cover Photographs :

Left – Hemlock looper moths on stem of balsam fir.

Right – Scleroderris canker damage to sitka spruce plantation.

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by L.J. Clarke and G.C. Carew

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1987

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ABSTRACT

This report summarizes forest pest conditions in Newfoundland and Labrador in 1986 and was compiled from information collected in 12 Forest Insect and Disease Survey Districts. Major pests of fir, spruce, pine and larch forests and deciduous tree species are discussed in detail and pests of lesser importance are tabulated.

RÉSUMÉ

Ce rapport est un résumé de la situation des ravageurs forestiers à Terre-Neuve et au Labrador en 1986. Les renseignements qu'il contient proviennent du relevé des insectes et des maladies des arbres effectué dans 12 districts. Les ravageurs des forêts de sapin d'épinette, de pin et de mélèze et ceux des espèces feuillues font l'objet d'un exposé détaillé et les les ravagers de moindre importance sont présentés sous forme de tableau.

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FOREST INSECT AND DISEASE CONDITIONS IN NEWFOUNDLAND AND LABRADOR IN 1986

by

L.J. Clarke and G.C. Carew

INTRODUCTION

This report summarizes forest insect and disease conditions in the forests of Newfoundland and Labrador in 1986 and forecasts conditions for 1987. The region is divided into 12 ranger districts with four district rangers responsible for detecting, monitoring and collecting forest pests, maintaining records and conducting surveys to support forest research and providing advisory services on forest pest and disease conditions to governments, industry and the general public. The information in this report was compiled from the observations and field records of the district rangers and other survey personnel. The Forest Insect and Disease Survey Districts and the Provincial Forest Management Units are included for reference (Figs. 1 and 2).

SUMMARY

The most important insects in the Province in 1986 were the eastern hemlock looper, balsam woolly aphid, spruce budworm, blackheaded budworm, green balsam looper and larch sawfly.

The birch casebearer, white-marked tussock moth, birch leafminer caused the most damage of hardwoods. The mountain ash sawfly and satin moth caused severe damage to ornamental trees in many residential areas.

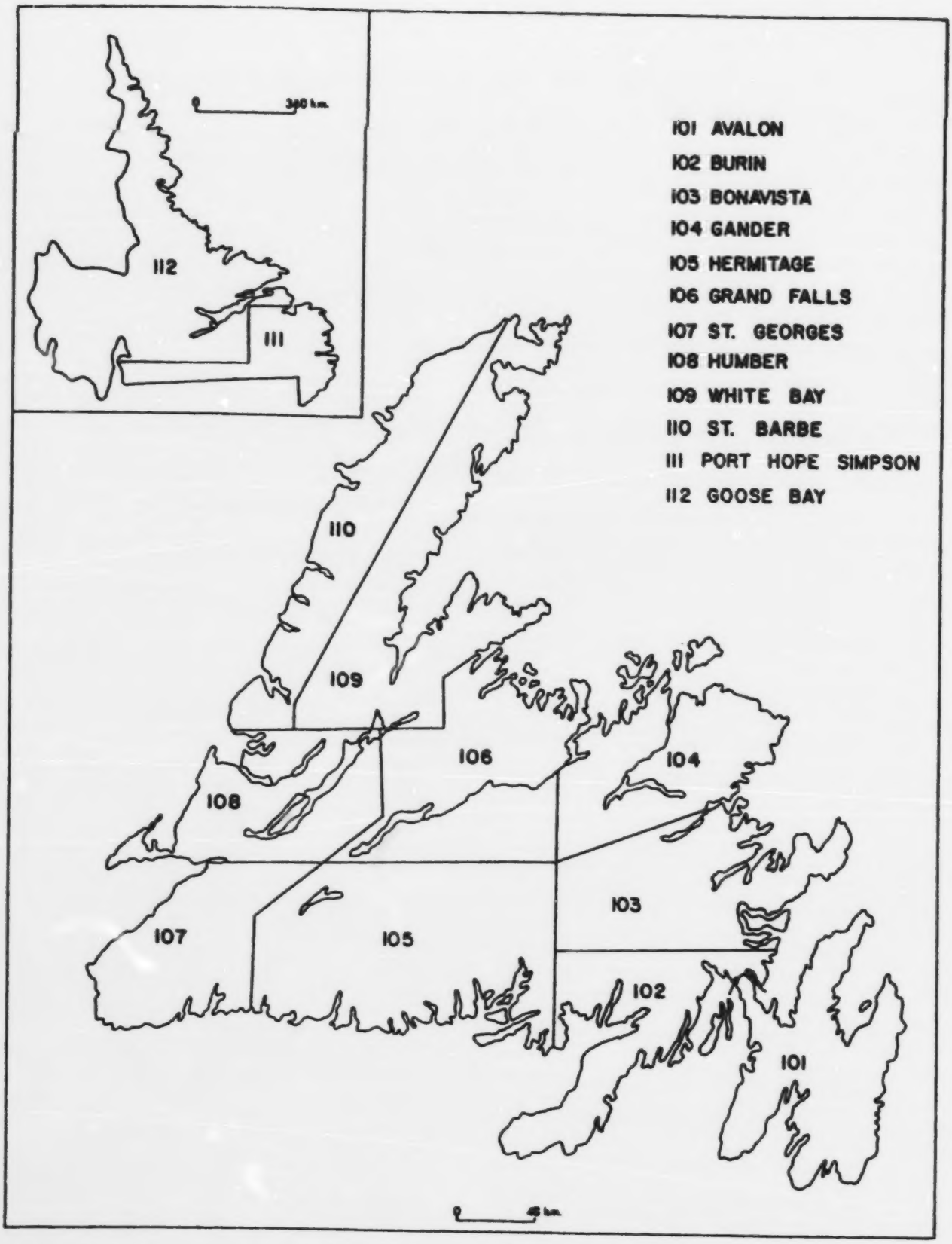

Figure 1. Forest Insect and Disease Survey Districts.

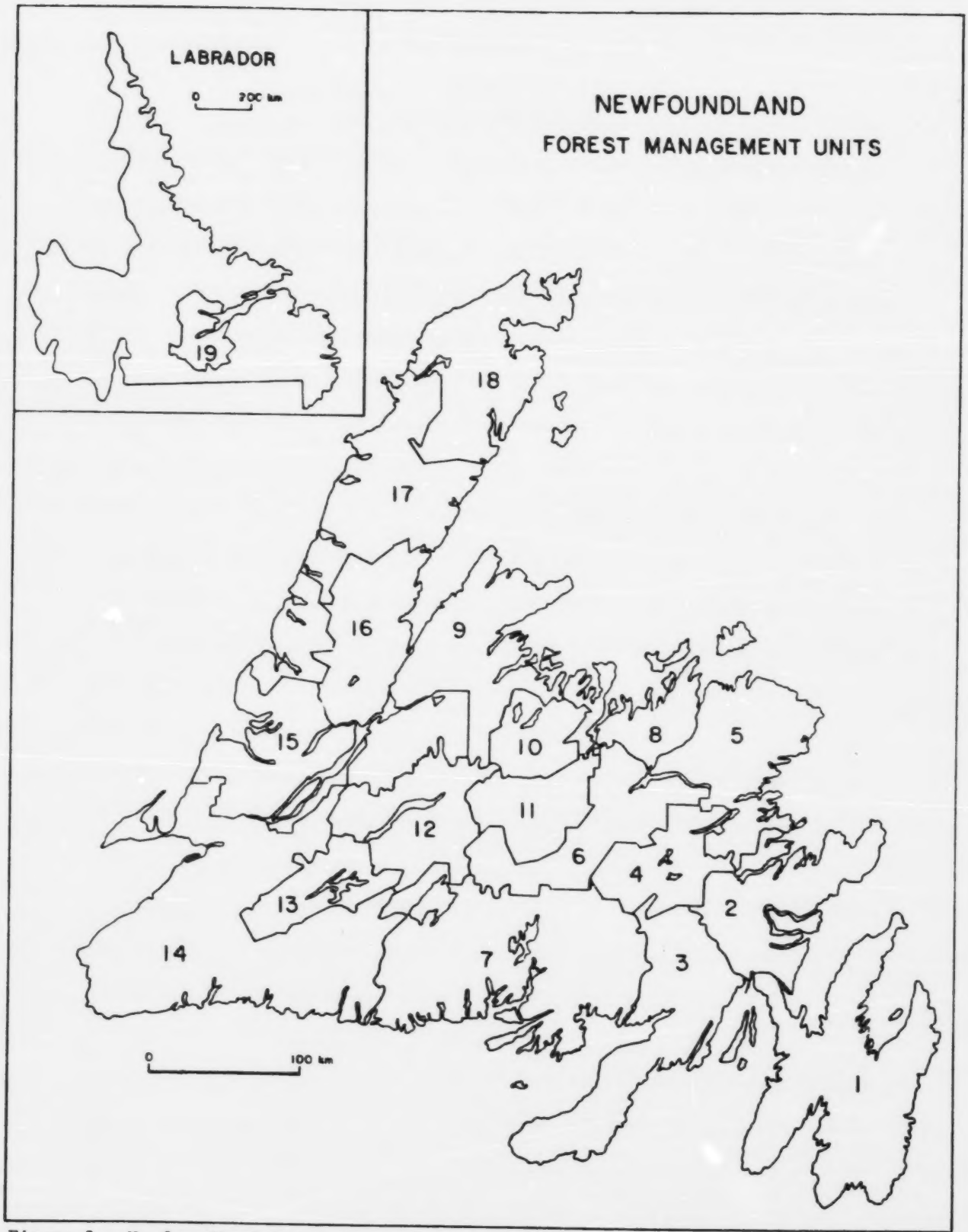

Figure 2. Newfoundland Forest Management Units.

The European strain of scleroderris canker caused severe damage to Sitka spruce in a plantation near Roddickton on the Northern Peninsula. Armillaria root rot was common in spruce budworm and hemlock looper damaged stands throughout the Island. Leaf and shoot blight of poplar was the most common disease on hardwoods in 1986.

Aerial surveys were conducted in fixed-wing aircraft and helicopters to monitor map defoliation and damage and collect branch samples of all important pests and forecast outbreaks. Approximately 50 hours were flown during aerial surveys and 217 hours during egg sampling and monitoring of hemlock looper and spruce budworm populations. Special surveys and studies conducted by survey rangers and by other forest protection personnel included the remeasurement of black spruce decline plots, testing of chemical and biological insecticides on the hemlock looper, continued testing of pheromone traps for spruce budworm, gypsy moth and forest tent caterpillar, biological control of the white-marked tussock moth, balsam woolly aphid studies in thinned stands, and monitoring of the mashed shrew in four permanent plots across the Island.

ARNEWS plots were monitored during a two week period in September. Tree assessment, a regeneration survey, ground vegetation and soil samples were completed. A forest fire destroyed the plot along the Bay d'Espoir road located near the Fisheries and Oceans monitoring area.

SPRUCE AND FIR PESTS

Eastern Hemlock Looper *Lambdina fiscellaria fiscellaria* (Guen.) - The weather in the early part of the season had higher than normal precipitation and less sunshine. There was a late snowfall and two nights of frost in early June but temperatures averaged above normal for the month. Hatching and early larval development was about two weeks ahead of normal. July had less sunshine and was colder and wetter than average. August was sunny and warm for most of the month with above normal temperatures. The weather in September during adult emergence, mating, egg laying and dispersal was colder and wetter than average.

The egg survey conducted in the fall of 1985 indicated that the area of moderate and severe defoliation by the hemlock looper in 1986 would reach about 219 000 ha distributed in four major areas in western Newfoundland and in several smaller areas in central and eastern parts of the Island. Light defoliation was also expected to occur on about 693 000 ha throughout the Island but this area contained about 165 000 ha where looper numbers were thought to be marginal to cause any noticeable defoliation.

The larval and aerial defoliation surveys showed that moderate and severe defoliation occurred on about 215 000 ha (Table 1). Severe reddening of balsam fir foliage was evident in the Codroy Valley from Brooms Brook to Codroy Pond, in the headwater areas of the major rivers of southwestern Newfoundland, from the Port au Port Peninsula to Corner Brook including the Cooks Brook area, from Cormack's Lake to Red Indian

Table 1. Areas (ha) of defoliation caused by the hemlock looper in productive forests of Newfoundland in 1986.

Management Unit No.	Defoliation Class[1]			
	Light	Moderate	Severe	Total
1	7 019	714	12 923	20 656
2	5 519	884	5 316	11 719
4	218	-	5 703	5 921
5	1 439	34	1 841	3 314
6	415	68	989	1 472
7	190	181	88	459
10	-	-	68	68
11	34	102	144	280
12	2 832	156	5 980	8 968
13	1 722	1 408	33 181	36 311
14	7 703	714	72 786	81 203
15	46 455	4 079	43 213	93 747
16	1 156	54	252	462
17	37 400	2 250	15 294	54 944
18	2 429	-	-	2 429
Sub-total	113 531	10 644	197 778	321 953
TNNP	423	82	2 920	3 425
GMNP	2 651	592	3 457	6 700
Grand Total	116 605	11 318	204 155	332 078

[1]Light 1-25%
Moderate 26-75%
Severe 76-100%

Lake, and in isolated areas from Hughes Brook to Bonne Bay Pond and from Rocky Harbour to Western Blue Pond in western Newfoundland. Severe defoliation also occurred near Gander, in Terra Nova National Park, near Triton Brook and Lake St. John, and on parts of the Bonavista and

Avalon Peninsulas (Fig. 3). Light defoliation was recorded on about 117 000 ha in 1986, extending from Bay of Islands to Lomond and from Bellburns to Hawkes Bay and near Ten Mile Lake in western Newfoundland. Light defoliation also occurred in numerous, isolated areas from Gander Bay to Random Island and in a few areas on the Bonavista and Avalon Peninsulas. Looper larval numbers were too low to cause noticeable defoliation in many stands forecast for light defoliation in 1986. However, these areas are of prime concern because of the possible expansion of the outbreak in 1987.

The Department of Forest Resources and Lands conducted an operational control program against the looper and treated about 81 000 ha with Fenitrothion and about 5 000 ha with Bacillus thuringiensis (B.t.).

The Canadian Forestry Service in cooperation with the Department of Forest Resources and Lands conducted an experimental program testing the effectiveness of new formulations and dosages of Fenitrothion and Dimilin. The results of these experiments are detailed in a separate report.

In 1986, samples of hemlock looper were collected from several sample areas. About 0.4% of hemlock looper samples were parasitized. The common larval parasite was in ichneumonid species and the pupae were parasitized by a tachinid species.

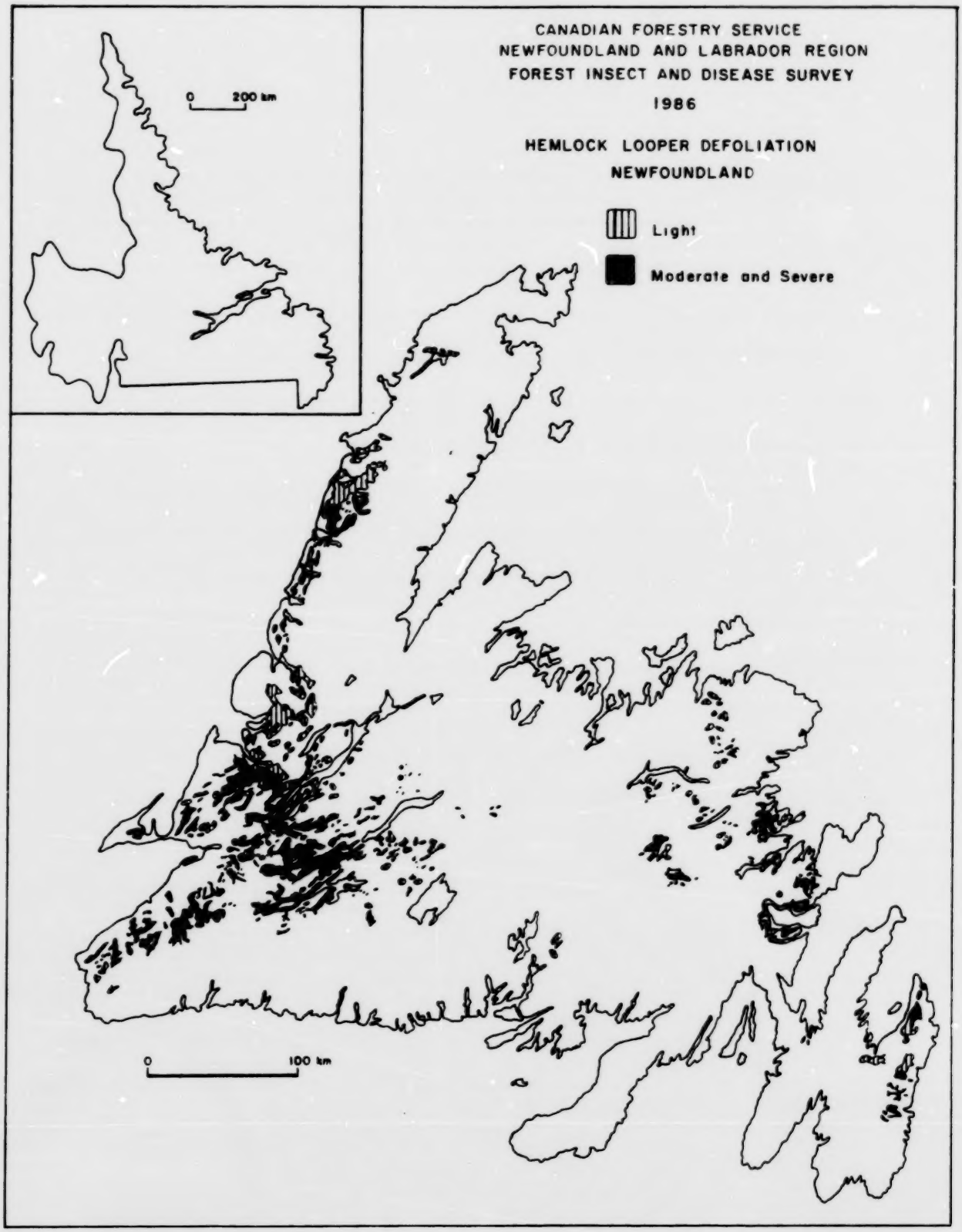

Figure 3. Areas of defoliation caused by the hemlock looper in productive forests of Newfoundland in 1986.

Fungal pathogens caused an average of about 4.5% mortality of the reared larval samples. However, larval mortality from pathogens reached as high as 20% in the oldest part of the outbreak on the Avalon Peninsula as compared to only 2% in samples from western Newfoundland. The major fungal pathogen was Entomophaga aulicae. Other fungal pathogens detected were Paecidomyces farinosus and Verticillium lecanii. Both P. farinosus and V. lecanii are new host records. About 0.5% of larval samples were infected by an undescribed microsporidian.

The majority of the severe defoliation occurred in western Newfoundland in predominantly mature and overmature stands, but some semi-mature stands were also severely damaged. Tree mortality may reach 80% in some stands within the next two years. In eastern Newfoundland more stands with new mortality was observed in the Terra Nova National Park, Triton Brook, Lake St. John, Ocean Pond, Long Harbour, Windsor Lake and near Aquaforte. The Department of Forest Resources and Lands will assess the damage at the inventory level.

The egg survey commenced in mid-October and branches were collected from about 830 sample points throughout the Island. Based on the comprehensive analysis of all data available about the outbreak, including results of the egg survey, and assuming favourable weather during larval development, the total area of moderate and severe defoliation forecast for 1987 is about 327 000 ha distributed mostly in western Newfoundland (Table 2, Fig. 4). Moderate and severe defoliation is expected to occur from Broom's Brook to Codroy Pond, in the headwaters of the major rivers of southwestern Newfoundland, from the Port au Port Peninsula to Corner Brook including the Cook's

Table 2. Areas (ha) of defoliation by the hemlock looper forecast in productive forests of Newfoundland for 1987.

Management Unit No.	Defoliation Class[1]			
	Light[2]	Light[3]	Moderate[4] and severe	Total
1	1 122	18 534	3 087	22 743
2	1 933	6 937	3 764	12 634
4	1 639	5 010	2 002	8 651
5	2 310	2 851	249	5 410
6	1 173	3 209	-	4 382
7	1 444	1 210	-	2 654
8	779	-	-	779
9	2 050	219	-	2 269
10	1 290	658	-	1 948
11	322	-	525	847
12	2 248	3 386	7 722	13 356
13	-	2 177	36 311	38 488
14	6 554	9 169	84 578	100 301
15	7 636	10 369	106 067	124 072
16	6 994	1 096	975	9 065
17	1 616	4 625	61 469	67 710
18	2 260	16 317	-	18 577
Total	41 370	85 767	306 749	433 886
TNNP	815	3 449	1 031	5 295
GMNP	-	1 067	19 372	20 439
Grand Total	42 185	90 283	327 152	459 620

[1]Light 1-25%
Moderate 26-75%
Severe 76-100%

[2]Areas with very low egg density (1 egg/branch).

[3]Areas with low egg density (2-3 eggs/branch).

[4]Areas with moderate and high egg density (4 or more eggs/branch).

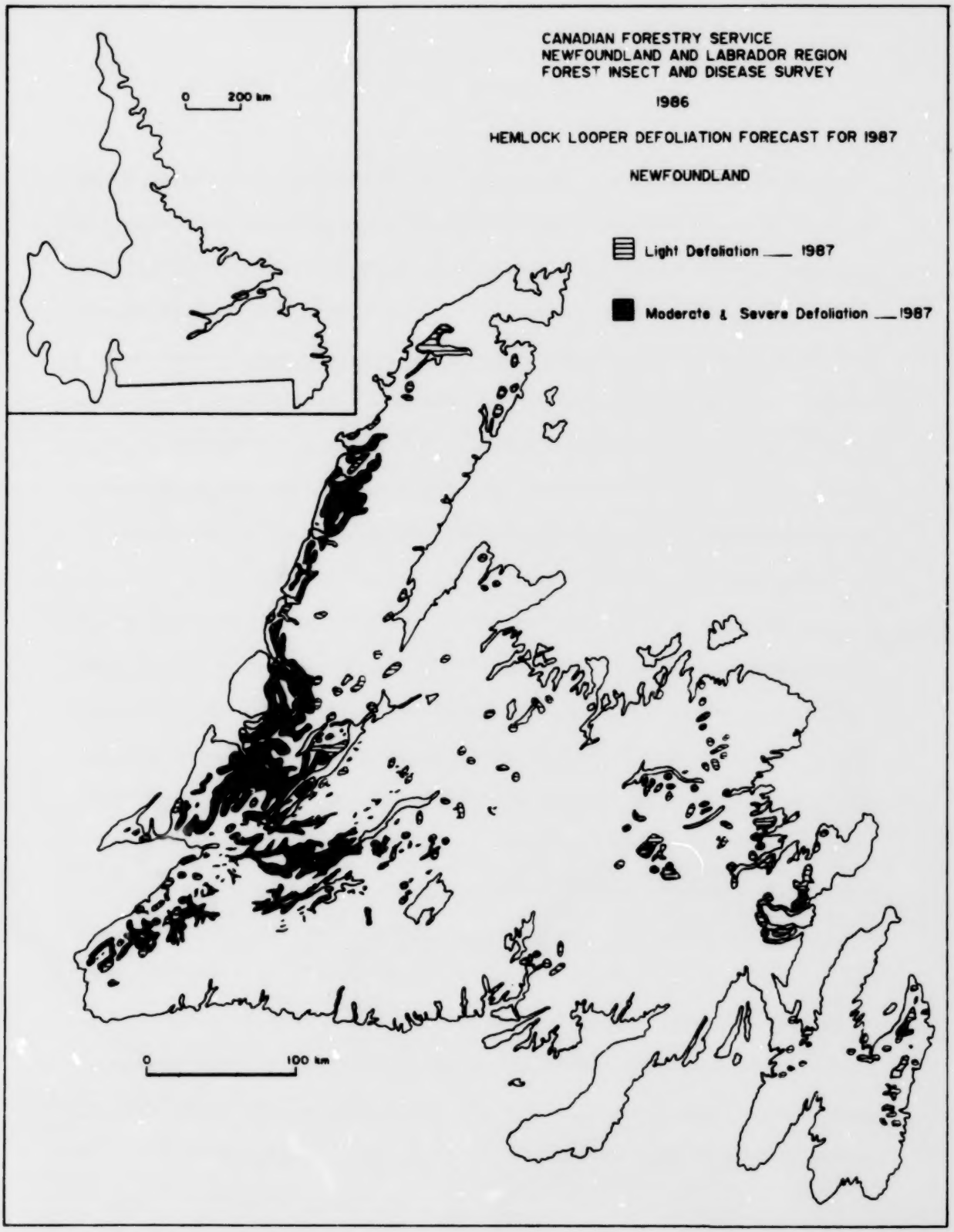

Figure 4. Areas of defoliation caused by the hemlock looper forecast in productive forests of Newfoundland for 1987.

Brook area, from Cormack's Lake to Red Indian Lake and from Hughes Brook to Bonne Bay Pond and along the west coast of the Northern Peninsula from Rocky Harbour to Hawkes Bay (Fig. 4). Moderate and severe defoliation is also expected in several isolated areas from Wilding Lake to Lake Ambrose near Sandy Lake (Badger), Deer Pond, Terra Nova National Park and in parts of the Bonavista and Avalon Peninsulas.

Light defoliation is forecast to occur on about 90 000 ha (Table 2, Fig. 4). Very low egg density (less than one egg per branch as sample) was present in an additional 42 000 ha but defoliation may not become noticeable in these areas.

In summary, the forecast indicates some decrease in the area of light defoliation from 117 000 ha in 1986 to about 90 000 ha in 1987, but a major increase in the areas of moderate and severe defoliation from 215 000 ha to about 327 000 ha. The areas of moderate and severe defoliation are expected to further decrease in central and eastern Newfoundland as indicated by the relatively high incidence of disease in these older infestations. However, severe defoliation is expected to continue and expand in western Newfoundland. It appears that the relatively cold and wet weather in September did not favor any significant moth dispersal to uninfested areas, but the egg density increased significantly in stands which were lightly defoliated in 1986 and many of these stands, particularly those located between Bay of Islands and Hawkes Bay are forecast to have very severe defoliation in 1987. Looper populations may

decrease from disease in late larval and pupal stages in some of the older parts of the outbreak in western Newfoundland but not before severe defoliation will have occurred leading to subsequent additional tree mortality.

Spruce Budworm, Choristoneura fumiferana (Clem.) - The decreasing major outbreak of the spruce budworm collapsed in 1985 and limited egg surveys and overwintering larval surveys indicated that no moderate and severe defoliation would occur in 1986. Light defoliation was forecast for 1986 in about 7 500 ha distributed mostly in western Newfoundland. However, larval sampling showed high budworm numbers at three locations near South Branch, Baie Verte and Noel Paul's Brook and severe defoliation occurred on about 2 200 ha. Light defoliation was recorded on 1800 ha (Table 3, Fig. 5). Generally, field sampling in 1986 showed an increase in budworm numbers throughout western Newfoundland, even in areas without any noticeable defoliation.

Table 3. Areas (ha) of defoliation caused by the spruce budworm in productive forests of Newfoundland in 1986.

Management Unit No.	Defoliation Class[1]			
	Light	Moderate	Severe	Total
9	1 680	-	837	2 517
12	68	-	371	439
14	86	-	994	1,080
Total	1 834	-	2 202	4 036

[1]Light 1-25%
Moderate 26-75%
Severe 76-100%

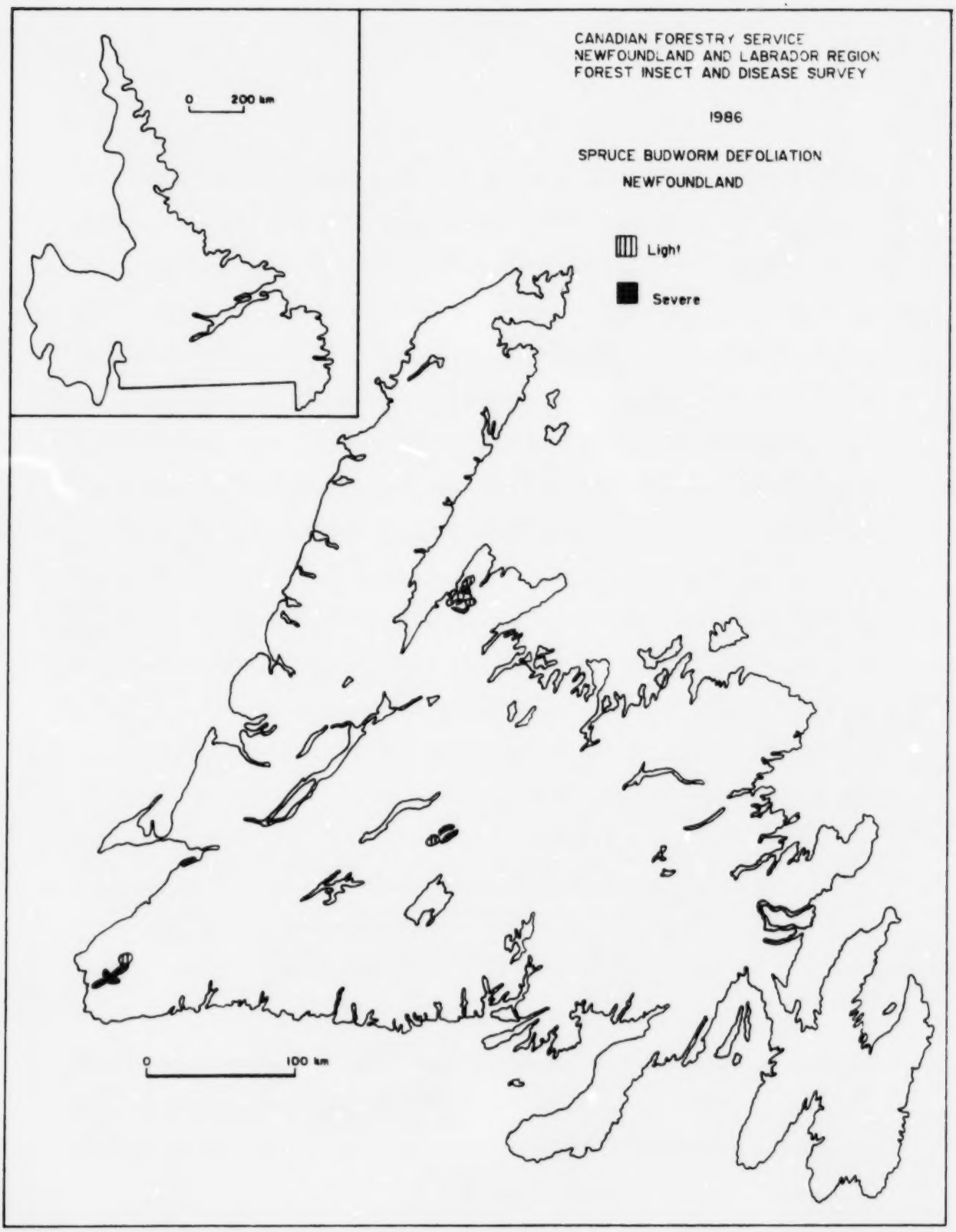

Figure 5. Areas of defoliation caused by the spruce budworm in productive forests of Newfoundland in 1986.

There was no operational or experimental control program conducted against the spruce budworm in 1986.

In 1986, samples of spruce budworm were collected from a population near Baie Verte. The major larval parasite was Glypta fumiferanae. The usually abundant Apanteles fumiferanae was very scarce this year. The major pupal parasite was Phaeogenes hariolus. About 15% of spruce budworm samples were parasitized.

Less than 1% of the spruce budworm samples were infected by the entomopathogenic fungi, Paecilomyces farinous and Erynia radicans. No microsporidian disease was detected in the samples. Pheromone traps were placed at 46 locations throughout the Island (Fig. 6). Moths were caught at 83% of the locations. The highest numbers were recorded near two severe infestations in western Newfoundland. Generally, some moths were trapped in all regions except the Avalon Peninsula. This rather uniform distribution is evidence of a widespread, endemic population. Generally much higher numbers of moths were caught in 1986 than in 1985 but it may be partly the result of improved potency of the lures in 1986.

Egg and overwintering larval samples were collected in conjunction with the looper egg survey in mid-October. The area of light, moderate and severe defoliation forecast for 1987 is about 34 000 ha including 9 800 ha in the moderate and severe category. Moderate and severe defoliation is expected in two locations, near South Branch and Baie Verte. Light defoliation is forecast to occur in several areas

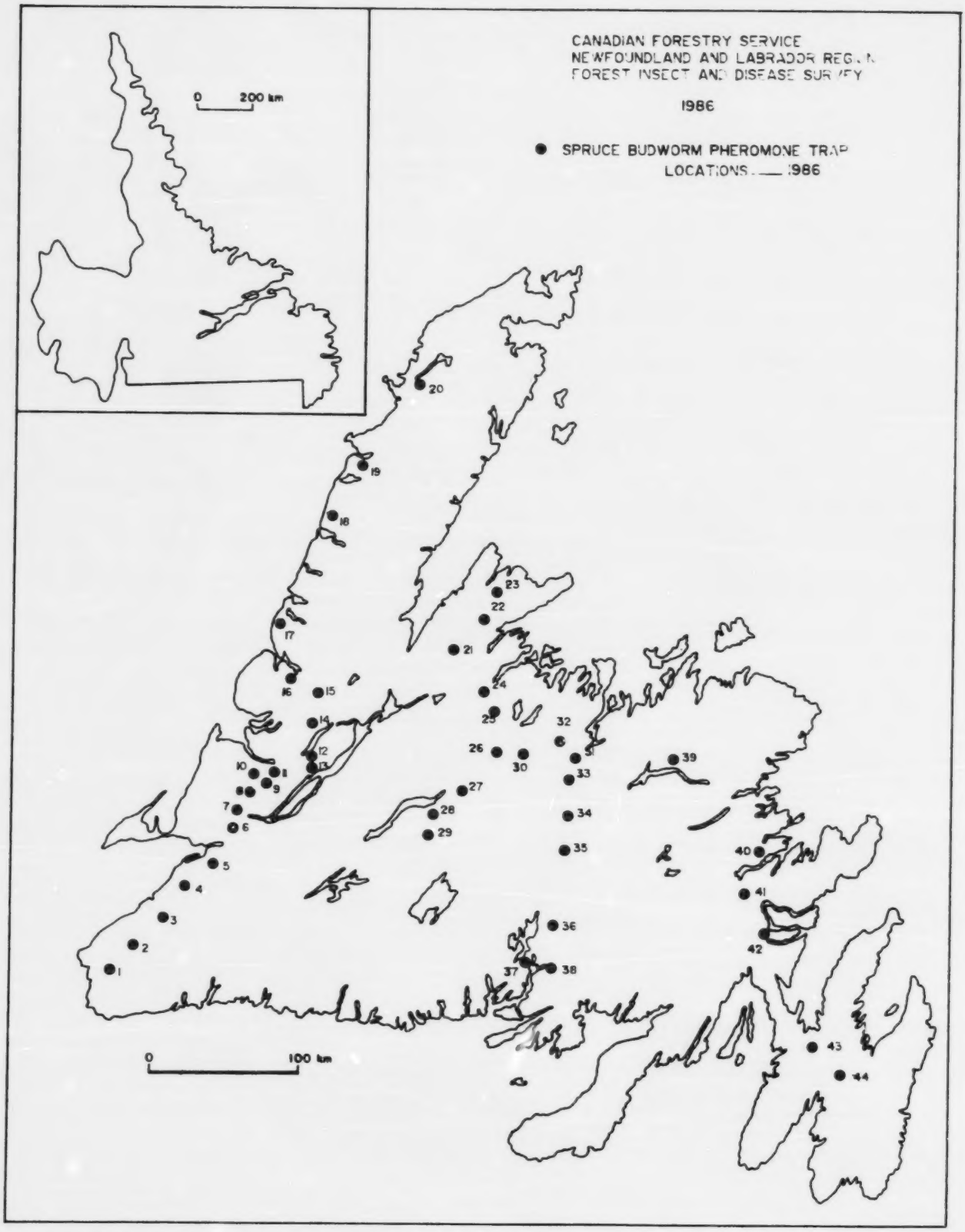

Figure 6. Spruce budworm pheromone trap locations.

throughout southwestern Newfoundland and near Noel Paul's Brook (Table 4, Fig. 7). Population levels indicated by the number of egg masses per 10 m^2 of foliage are expected to be high in the moderate and severe category (Table 5).

Table 4. Areas (ha) of defoliation by the spruce budworm forecast in productive forests of Newfoundland for 1987.*

Management Unit No.	Defoliation Class[1]		
	Light	Moderate and severe	Total
9	-	6 432	6 432
12	3 310	-	3 310
14	15 371	3 384	18 755
15	1 589	-	1 589
16	3 356	-	3 356
Total	23 626	9 816	33 442

*Forecast based on egg-mass and overwintering larval surveys.

[1]Light 1-25%
Moderate 26-75%
Severe 76-100%

Balsam Woolly Aphid, Adelges piceae (Ratz.) - Surveys conducted throughout western and central Newfoundland showed increased aphid damage to many young balsam fir stands particularly in western Newfoundland. The Canadian Forestry Service increased its research into the infestation of thinned and natural young stands. A general survey of the aphid boundaries and sampling was also completed to check on population levels. These samples are presently being counted and results will be available at a later date.

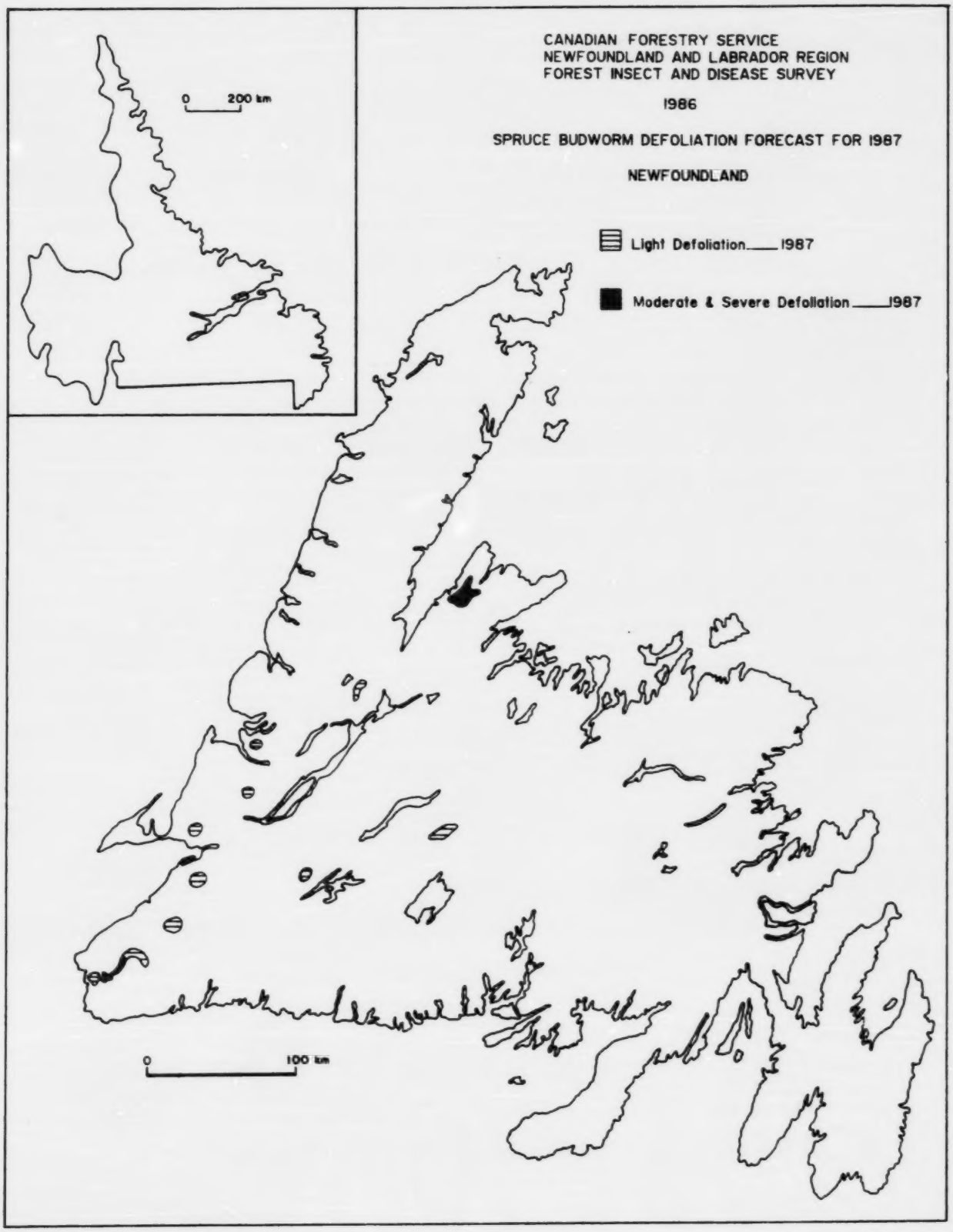

Figure 7. Areas of defoliation caused by the spruce budworm forecast in productive forests of Newfoundland for 1987.

Table 5. Summary of spruce budworm eggmass numbers per 10 m^2 of foliage for eggmass points with moderate and severe defoliation forecast in Newfoundland from 1978 to 1986.

Year	Moderate Defoliation Forecast*		Severe Defoliation Forecast*	
	Number sample points	Average EM/10 m^2	Number sample points	Average EM/10 m^2
1986	1	214	1	1071
1985	0	0	0	0
1984	2	157	1	321
1983	4	117	4	301
1982	10	147	7	379
1981	4	129	4	440
1980	49	149	123	437
1979	65	149	149	438
1978	72	154	124	491

*Class limits for defoliation forecast based on eggmasses per 10 m^2 of foliage.

Defoliation forecast	
Nil	0%
Light	1-25%
Moderate	26-75%
Severe	76-100%

Scleroderris Canker, Gremmeniella abietina (Lagerb.) Morelet -

Scleroderris canker has been confirmed in a 20 year old Sitka spruce experimental plantation near Roddickton on the Northern Peninsula. A general survey of the plantation showed positive signs and symptoms of the disease. Cultures from samples taken in late 1985 were found to be European strain. Additional cultures from samples collected in June 1986 were also characterized serologically as the European race. This is the first record of the disease outside the Avalon Peninsula. The infected

trees will be pruned or removed and burnt in 1987 in an effort to eradicate the disease in this area. All other Sitka spruce plantations established from the same stock were also inspected and sampled. Cultural identification of the disease is in progress. The canker disease also affected 30% of Austrian pine trees on Pitts Memorial Drive near St. John's. The trees were pruned to control infection.

Wind Drying of Black Spruce Plantations - Plantations at Springdale, West Bottom Brook Road, South Pond Road, West Lake Road, Pamehac, Sandy Pond area, Northwest Gander River and New Bay Lake had varying degrees of reddening of needles with the most severe at Springdale and West Bottom Brook Road where about 90% of the trees were damaged, including 10% tree mortality. Several factors were considered as causal agents including the spruce spider mite Oligomichus ununquis (Jacobi), Armillaria root rot and 50% nutrient deficiency. However, it was concluded that persistent warm high winds in the spring of 1986 caused the severe reddening and mortality in these plantations.

Blackheaded Budworm, Acleris variana (Fern.) - A small infestation of this budworm occurred along the Traverspine River in Labrador. Only the tops of mature balsam fir were defoliated to any degree and damage to the stand was generally light. Larvae were collected at widely separated locations along the Churchill Road and in several provincial parks in central and eastern Newfoundland.

Green Balsam Looper, Cladara limitaria (Wlk.) - A light infestation of this insect occurred along the Cat Arm Road to 3 km beyond Great Coney Arm in the White Bay area. Moderate population levels caused 20% defoliation of current foliage on mature balsam fir. This is the first recorded infestation of this looper in the Province.

Armillaria Root Rot, Armillaria mellea (Vahl. ex Fr.) Kummer - In 1986, balsam fir trees were examined in three localities in western Newfoundland for the incidence of Armillaria root rot. These trees had been previously damaged by the spruce budworm but showed a marked recovery in the last few years after the collapse of budworm infestations. In the Bonne Bay locality 75% of the trees were infected by the root rot. However, all of the trees examined and infected were exhibiting various stages of recovery. At Gallants, 25% of the trees showed symptoms of infection with similar results of recovery. Almost half of the trees examined at Little Barachois River were infected but results of recovery from infection showed similar trends as those from other localities. These trees may continue to recover, but even light defoliation by the hemlock looper may increase the effects of root rot infection leading to increased tree mortality.

Needle Rust of Conifers - Needle rusts of balsam fir, Pucciniastrum epilobii Otth and black spruce, Chrysomyxa ledicola Lagerh. C. empetri Schroet. ex Cummins - A high incidence of needle rust occurred on balsam fir near Mary Anne Lake. Up to 100% of the new foliage was affected on 70% of the young balsam fir. A low incidence of the rust was recorded on fir in South West Brook, La Scie Road.

A moderate incidence of needle rust of blue spruce was recorded in St. John's. Up to 40% of the new foliage was affected on some trees. A low incidence was observed at Chapel Arm and Newtown. At Whitbourne, 5% of the new foliage of black spruce was affected.

Balsam Fir Sawfly, Neodiprion abietis Complex - Low numbers were collected along the Northern Peninsula near River of Ponds, Hawkes Bay and along the St. Anthony Road 8 km west of Cooks Harbour Road. A trace of defoliation was recorded in the thinned stands near Pistolet Bay area. The last infestation of this pest occurred near Marystown in 1978.

Broom Rust, Melampsorella caryophyllacearum Schroet. - Broom rust of balsam fir was common and widespread throughout the Island. A moderate incidence was observed near Portugal Cove where 10% of the trees were affected. Other areas of common occurrence were Main Brook, Hawkes Bay, St. Phillips and Bauline Line where up to 5% of the trees showed symptoms.

Eastern Dwarf Mistletoe, Arceuthobium pusillum Pk. - Dwarf mistletoe continued to expand in a black spruce stand near Gambo. The incidence of spread of the parasite showed that more trees were affected in 1986 than any of the previous three years. There was an overall increase in mistletoe infection of 60%. Up to five brooms were visible on newly parasitized trees and up to seven visible brooms were on older parasitized trees.

Needle Cast of Conifers - Hypodermella laricis Tub. and Isthmiella faullii (Darker) Darker - A moderate incidence of needle cast occurred on larch south of the Exploits Dam. A low incidence occurred on balsam fir at the south of Twillick Brook and at Windsor Lake where a few road side trees were affected.

Winter Drying - Winter drying affected many species of trees throughout the Island. High incidences were recorded at Bottom Brook Arboretum on 100% Corsican pine at St. John's on 80% of the foliage of many Austrian pine; near Crescent Lake on 75% of Sitka spruce in a plantation at Wooddale Nursery where some mortality of black spruce occurred; near Daniels Harbour where exposed balsam fir stands showed symptoms; near North Pond where Scots pine showed characteristic browning of foliage; and at Pasadena Nursery where 30% of the foliage on most of the spruce hedgerow had winter drying symptoms.

Frost Damage - Frost damage was widespread and severe throughout the Island in 1986. A high incidence occurred on white birch on the Grand Lake Road in Labrador. Up to 70% damage of foliage was recorded to 50% of the stand. East of Gander many speckled alder had up to 70% of the foliage affected. A severe incidence was reported from West Clarenville where speckled alder was affected. Severe damage occurred as well at the Pasadena Tree Nursery and in thinned stands near Morris Brook. A moderate incidence was observed on white spruce seedlings at the Wooddale Nursery where some mortality resulted.

PINE AND LARCH PESTS

Larch Sawfly, Pristiphora erichsonii (Htg.) - Population levels were high for the third consecutive year on the Avalon Peninsula. Severe defoliation of larch stands was recorded from Goulds to Avondale. Light defoliation was also recorded in the Terra Nova National Park.

Shrew trapping was conducted in the four plots across the Island in October. Results of this trapping are summarized in Table 6.

Table 6. Estimated number of shrews per hectare in Newfoundland.

	October				
Location	1982	1983	1984	1985	1986
St. George's	4.30	10.77	2.15	3.21	2.15
Hall's Bay	6.45	4.30	6.45	3.21	2.15
Terra Nova	8.60	4.30	10.80	-	6.42
Paddy's Pond	5.39	3.24	5.39	2.15	5.39

Larch Casebearer, Coleophora laricella (Hbn.) - Severe defoliation was recorded in a small infestation of about 2 ha in a larch stand near the junction of the harbour arterial and Newtown roads. It is rarely that this insect occurs in high numbers on the Island.

Redheaded Pine Sawfly, Neodiprion lecontei (Fitch) - Sawfly larvae collected from white pine near the junction of the Charlottetown Road and the Trans Canada Highway in the Terra Nova National Park were tentatively identified as the redheaded pine sawfly. This would be the first record

for the Province if the identification is confirmed. The larvae caused severe defoliation on a few white pine trees near the Warden's station. This insect can cause tree mortality to ornamental pines and could be a serious pest to hard pines in natural and planted stands. This infestation will be monitored closely and a nuclear polyhedrosis virus may be applied with the co-operation of park officials in 1987.

European Pine Sawfly, Neodiprion sertifer (Geoffrey) - This insect caused severe defoliation to both red and Scots pine in the St. John's - Mount Pearl area. Several trees in open areas near Barbour Drive and Burgess Avenue were severely defoliated this summer. A nuclear polyhedrosis virus has been applied to the sawfly on ornamental pines in the city and has caused high larval mortality. This control measure will be continued in our effort to prevent the spread of this pest.

Diplodia Blight, Diplodia pinea (Desm.) Kickx - Diplodia blight of Scots pine was recorded at North Pond. About 10% of the trees showed symptoms of chlorotic and dead needles at the tip of the shoots of living trees.

Pine Root Collar Weevil, Hylobius warreni Wood - Severe damage of pines by the pine weevil has occurred at the North Pond Plantation during the past few years. A survey of the area in 1986 showed that one planted area had between 10-20% of the trees dead and dying. In another area which was being thinned about 1% of the plantation was affected.

Light damage occurred in an immature white spruce plantation on South Side Road along the Exploits River. About 10% of the trees were affected and less than 1% had died.

White Pine Blister Rust, Cronartium ribicola J.C. Fischer - The white pine blister rust continued to be common and widespread wherever white pine occurred in the Province. Near the mouth of the Northwest Gander River 50% of the naturally occurring white pine were affected. Ornamental white pine trees in St. John's and Corner Brook were also infected with up to 10% of the branches affected.

Pinewood Nematode, Bursaphelenchus xylophilus (Steiner and Buhrer) Nickle - The Forest Insect and Disease Survey in cooperation with Memorial University conducted the field work collecting wood borings and discs for evidence of this pest in the Province. The nematode is a plant parasite causing serious damage in Japan and many parts of the United States but has not been found in Newfoundland.

DECIDUOUS TREE PESTS

Birch Casebear, Coleopohora serratella (L.) - Population levels were generally low throughout western Newfoundland except for some moderate to severe patches of infestation from Bonne Bay to Big Falls and from Gambo to St. John's. Severe infestations of speckled alder occurred from Pouch Cove 2 km along the Bauline Line and along the north side of Windsor Lake.

Leaf and Shoot Blight of Poplar, Pollacia elegans Serv. - Leaf and shoot blight of trembling aspen continued to be common and widespread on the Island. A high incidence of the disease was recorded on regeneration

in a control burned area at Pynn's Brook in western Newfoundland. A moderate incidence occurred in a stand at Sheffield Lake causing damage to regeneration. At Goose Bay 50% of the trees were infected. Low incidences of leaf and shoot blight of silver poplar was recorded at Pasadena where 20% of the foliage was affected.

White-marked Tussock Moth, Orgyia L. leucostigma J.E. Smith - The infestation along the Bottom Brook Road continued for the second consecutive year. The infestation caused severe damage to hardwoods, mostly birch and alder although some spruce and larch seedlings in a nearby plantation were also attacked. A virus was sprayed in the infestation as a biological control and results are summarized in a separate report.

A separate infestation of this insect occurred near Overfalls Brook in the Codroy Valley causing 20-30% defoliation to white birch and speckled alder.

Satin Moth, Leucoma salicis (Linn.) - This insect is usually found in areas where ornamental poplars and willows are planted. Population levels have been high throughout the Corner Brook area for the past three years and some top and branch mortality has occurred.

Mountain Ash Sawfly, Pristiphora geniculata (Htg.) - Severe defoliation occurred on ornamental trees throughout the St. John's - Mount Pearl areas again in 1986. Light to moderate defoliation was also recorded in the Pasadena area. The introduced parasite Olesicampe geniculata near Oxen Pond Botanic Park in St. John's has become established. Collections near the release sites showed high parasitism of sawfly larvae.

Aspen Leafminer, Phyllocnistis populiella (Chamb.) - Population levels of this leafminer were high again in 1986 along the Pinus River and Churchill River in Labrador. Severe damage to 70-100% of the foliage of trembling aspen was recorded. Moderate damage occurred along the Hampden Road to Birchy Basin.

Nectria Canker, Nectria cinnabarina Tode ex Fr. - Nectria canker was common on hardwoods in urban areas of the Province. In St. John's older trees were mostly affected with large branches showing dieback. Up to 20% of the branches were affected on basswood in Topsail. Other areas with branch cankers and dieback symptoms were Gander, Winter Brook, St. Phillips and Bell Island.

Fall Webworm, Hyphantria cunea (Drury) - Population levels were low this year after two years of high numbers in the Stephenville Crossing - Black Duck area. The webworm attacks roadside alder, birch and willow and is not considered a serious pest in the Province.

Gypsy Moth, Lymantria dispar (L.) - This insect is not present in Newfoundland but pheromone traps were placed in camping sites, parks and near towns to catch any moths that may be accidentally introduced to the Island on camper vehicles. This survey was done in cooperation with the Plant Health Division of Agriculture Canada. No moths were caught in these traps in 1986.

Forest Tent Caterpillar, Malacosoma disstria Hbn. - This insect is not present in Newfoundland, but pheromone traps were used near parks and major towns throughout the Island to collect any moths that might be accidentally introduced on vacation vehicles. No moths were caught in these traps in 1986.

OTHER INSECTS AND DISEASES

Insect or Disease	Host(s)	Location	Remarks
Alder leaf beetle *Chrysomela mainensis mainensis* Bech.	Alder	Western Newfoundland	Low populations and light defoliation.
Alder leaf miner *Fenusa dohrnii* Tischb.	Alder	Western and eastern Newfoundland, eastern Labrador	Low to moderate populations. Browning ranged from light to severe.
Anthracnose *Kabatiella apocrypta* (Ell. & Ev.) Arx	Red maple	Western Newfoundland	Low incidence. 10% of foliage on some trees affected.
Balsam twig aphid *Mindarus abietinus* Koch.	Balsam fir white spruce	Western and eastern Newfoundland	Populations ranged from low to high. Moderate infestations recorded at two locations on the Avalon Peninsula.
Birch leafminer *Fenusa pusilla* (Lep.)	White birch	Eastern Newfoundland, eastern Labrador	Low to high numbers, trace to moderate browning.
Black knot *Apiosporina morbosa* (Schw.) Arx	Pin cherry	Avalon Peninsula	Low incidence near St. John's.
Cytospora canker and dieback *Cytospora* species	Red maple Silver maple Sugar maple Sycamore maple American mountain-ash	Avalon Peninsula	Moderate incidence; up to 30% of the branches were affected. Apparently trees were stressed due to climatic and soil conditions.

Other Insects and Diseases (Cont'd.)

Insect or Disease	Host(s)	Location	Remarks
Eastern spruce gall aphid *Adelges abietis* (Linn.)	Black spruce Sitka spruce Engelmann spruce	Western and central Newfoundland	High numbers and 10% damage to Sitka spruce seedlings in Pasadena nursery.
European spruce sawfly *Gilpinia hercyniae* (Htg.)	Black spruce White spruce Sitka spruce Engelmann spruce Balsam fir	Western and eastern Newfoundland; eastern Labrador	Low populations. No significant damage.
Four-eyed spruce bark beetle *Polygraphus rufipennis* (Kby.)	Black spruce	Northern Peninsula Eastern Labrador	High numbers found on wind-thrown black spruce.
Gray mold blight *Botrytis cinerea* Pers.	Japanese larch	Central Newfoundland	Low incidence. Seedlings affected.
Greenheaded spruce sawfly *Pikonema dimmockii* (Cress.)	Black spruce White spruce	Western Newfoundland Eastern Labrador	Low populations. No significant defoliation.
Ice storm damage	Softwood and hardwood species	Avalon Peninsula	Considerable damage to Scots pine, trembling aspen, pin cherry and white birch in Conception Bay areas and to ornamental trees in and around St. John's.

Other Insects and Diseases (Cont'd.)

Insect or Disease	Host(s)	Location	Remarks
Ink spot *Ciborinia whetzelii* (Seav.) Seav.	Trembling aspen	Eastern Labrador	Low incidence.
Leaf blight *Entomosporium mespili* (D.C. ex Duby) Sacc.	Hawthorn	Mount Pearl	New record; 30% of the foliage affected.
Leaf blister *Taphrina caerulescens* (Mont. & Desm.) Tul.	Red oak	Eastern Newfoundland	New record; 5% of the foliage affected.
Taphrina populina Fr.	Hybrid poplar Lombardy poplar	Western, central and eastern Newfoundland Avalon Peninsula	Up to 35% of the foliage affected in western Newfoundland.
Leaf rust *Melampsora abieti-capraearum* Tub.	Pussy willow	Eastern Newfoundland	Moderate incidence with up to 40% of the foliage affected.
Leaf scorch	White birch	Central Newfoundland	80% damage to one tree.

Other Insects and Diseases (Cont'd.)

Insect or Disease	Host(s)	Location	Remarks
Leaf and shoot blight *Venturia macularis* (Fr.) Müll. & Arx	Trembling aspen	Throughout Newfoundland Eastern Labrador	High incidence on regeneration in a control burn in western Newfoundland. Moderate incidence near Goose bay in eastern Labrador. Light to moderate incidence elsewhere.
Leaf spot *Marssonina brunnea* (Ell. & Ev.) Sacc.	Berlin "Hybrid" poplar	Avalon Peninsula	High incidence; 100% of hybrid poplar were affected with up to 95% of the foliage affected.
Leaf spot *Phyllosticta* sp.	American mountain-ash	Western Newfoundland Avalon Peninsula	Low to moderate incidence on few trees.
Mourning cloak butterfly *Nymphalis antiopa* (L.)	Willow American mountain-ash Misc. shrubs	Western Newfoundland Avalon Peninsula Eastern Labrador	Low to moderate numbers. A trace to severe defoliation in western Newfoundland. Light defoliation in eastern Labrador.
Nectria canker *Nectria galligena* Bres.	Maple	Central Newfoundland	Cankers are visible on branches.
Needle cast *Isthmiella crepidiformis* (Darker) Darker	White spruce	Avalon Peninsula	5% of the foliage affected on 1% of the trees.

Other Insects and Diseases (Cont'd.)

Insect or Disease	Host(s)	Location	Remarks
Orange spruce needleminer *Coleotechnites piceaella* (Kft.)	Balsam fir	Western and eastern Newfoundland	Low numbers. No significant damage.
Phomopsis blight *Phomopsis juniperovora* Hahn.	Juniper	Avalon Peninsula	Up to 10% of the foliage was affected on ornamental trees in the St. John's area.
Poplar serpentine leafminer *Phyllocinistis populiella* (Cham.)	Trembling aspen Balsam poplar Speckled alder	Western and eastern Newfoundland, eastern Labrador	Severe damage in western Newfoundland and eastern Labrador. A trace to moderate damage recorded elsewhere.
Purple eye spot *Phyllosticta minima* (Berk. & Curt.) Underw. & Earle	Red maple	Western Newfoundland	Low incidence; up to 20% of the foliage was affected on young maples.
Red flag *Fusicoccum abietinum* (Hartig) Prill. & Del.	Balsam fir	Avalon Peninsula	Up to 10% of the foliage was affected on 10% of the trees.
Redmarked caterpillar *Feralia jocosa* (Gn.)	Balsam fir White spruce	Western and central Newfoundland	Low numbers. No significant defoliation.
Roadside damage	Balsam fir	Northern Peninsula	Common along Roddickton Road.

Other Insects and Diseases (Cont'd.)

Insect or Disease	Host(s)	Location	Remarks
Rust gall *Gymnosporangium cornutum* Arth. and Kern	American mountain-ash	Avalon and Baie Verte Peninsulas	Low incidence.
Rusty tussock moth *Orgyia antigua* (L.)	Balsam fir White birch Willow	Western and eastern Newfoundland, eastern Labrador	High population found at one location in eastern Newfoundland.
Spruce bud moth *Zeiraphera canadensis* Mut. & Free.	White spruce Black spruce	Western Newfoundland	Populations low; 10% damage recorded on White spruce in western Newfoundland.
Spruce coneworm *Dioryctria reniculelloides* Mut. & Mun.	White spruce Sitka spruce Black spruce Balsam fir Tamarack	Western and eastern Newfoundland	Low populations. No significant damage.
Spruce cone gall midge *Dasineura canadensis* Felt	White spruce	Western and eastern Newfoundland.	Low numbers. Cone collections.
Spruce cone maggot *Delia anthracina* (Czerny)	White spruce Black spruce Balsam fir	Western and eastern Newfoundland	Low numbers. Cone collections.

Other Insects and Diseases (Concl'd.)

Insect or Disease	Host(s)	Location	Remarks
Spruce seed moth *Cydia strobilella* (L.)	Black spruce White spruce	Western Newfoundland	Low numbers. Cone collections.
Spruce spider mite *Oligonychus ununguis* (Jac.)	Black spruce	Central and eastern Newfoundland	Moderate populations
Striped alder sawfly *Hemichroa crocea* (Geoff.)	Speckled alder	Western and eastern Newfoundland, eastern Labrador	High populations. Defoliation ranged from a trace to 80%.
Taphrina witches' broom *Taphrina cerasi* (Fckl.) Sadeb.	Pin cherry	Avalon Peninsula	Up to 10% of the foliage was affected on some trees in St. John's area.
Willow blight *Fusicladium saliciperdum* (All. & Tub.) Lind.	Laurel willow Willow	Western Newfoundland Avalon and Burin Peninsulas	Moderate incidence on laurel willows on the Burin Peninsula.
Willow sawfly *Nematus limbatus* (Cress.)	Willow	Western and central Newfoundland	Moderate to high populations; 100% defoliation recorded on two trees in western Newfoundland.
Witches' broom *Melampsorella caryophyllacearum* Schroet.	Balsam fir	Northern Peninsula	Low incidence. Common throughout area.